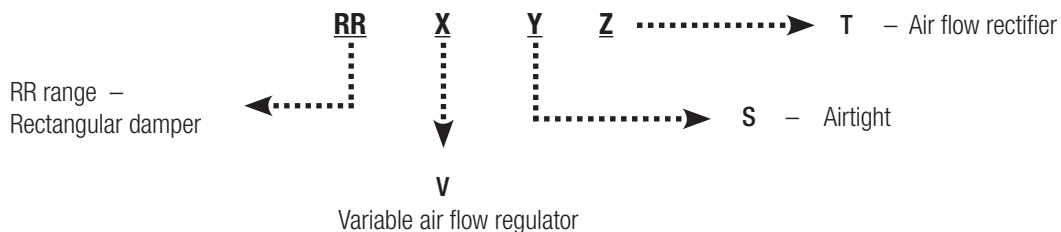


VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

The RRVS/RRVS-T regulator is a variable air flow self-regulated system (VAV type). It is used to regulate the air flow in an area or room of a building according to a setpoint.

CODIFICATION



CONSTRUCTION

Blades
Galvanized steel <i>Option: inox 304L, aluminium</i>
EPDM gaskets



Casing
Galvanized steel <i>Option: inox 304L, inox 316L</i>

Linkage
Gear wheels

CARACTERISTICS

	RRVS / RRVS-T
Upstream/downstream airtightness (EN1751)	Class 3
Frame's airtightness (EN 1751)	Class C
Working range	Velocity, 1.5 - 10 m/s Pressure, 50 to 450 Pa
Operating temperatures	From -20°C to +80°C
Control	2-10 V signal by Belimo type actuator (24 V AC/DC) <i>Option: 0-10 V, communicating servomotor</i>
Accessories	Remote control supplied to modify the regulation range on site = ZTH - EU Circular silencers to be installed downstream from the regulator: CONFORT or OPTIMUM
Option	Acoustic enclosure

VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

OPERATING PRINCIPLE

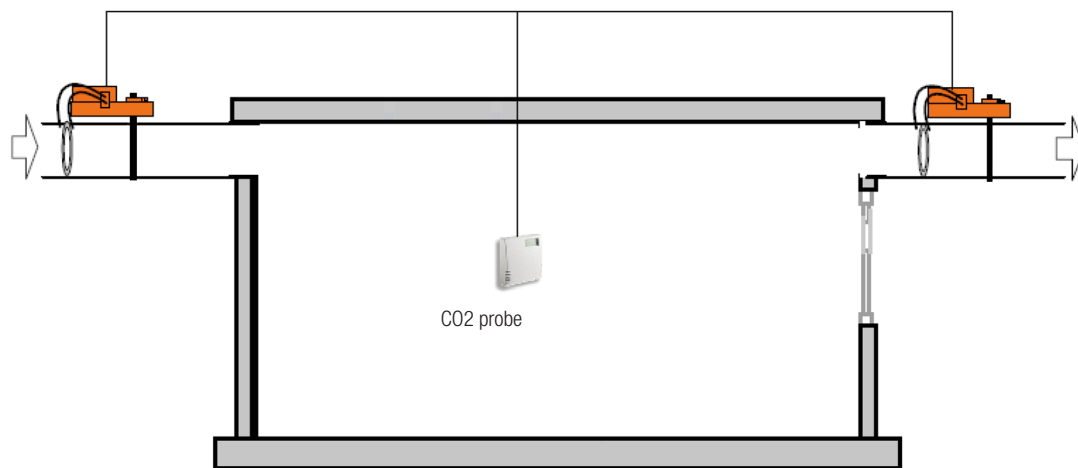
The air volume requirement of a room is identified by a probe and then converted into a 2-10 V signal.

This signal, or setpoint, allows the regulator to adapt its position independently of upstream flow or pressure variations.

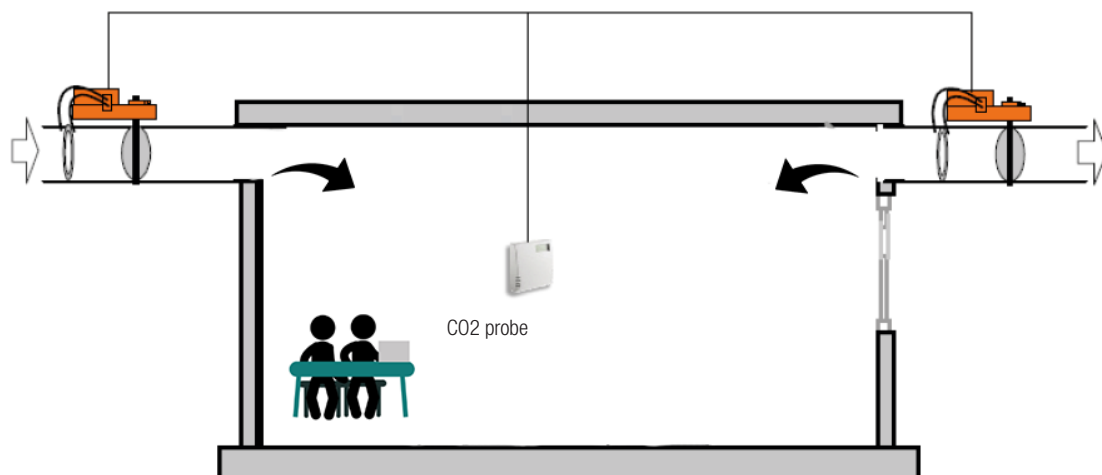
Example :

Meeting room with an RRVS 200 x 200 set between 200 and 650 m³/h, wired in 2-10V and slaved to a CO₂ probe:

- 0 person: setpoints between 0 and 0.5 V - Closure



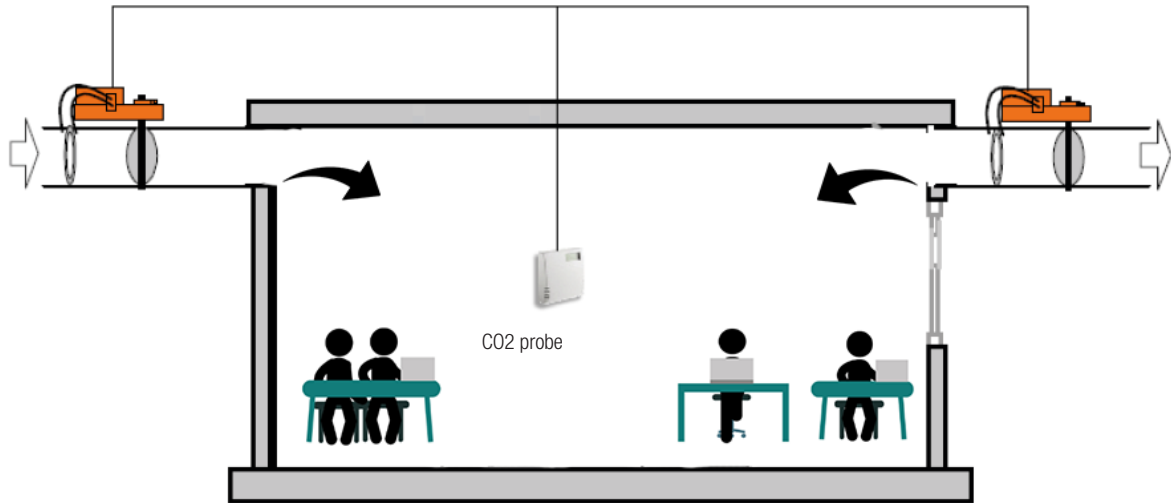
- 2 persons: setpoint 2 V - Minimum flow rate 200 m³/h



VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

- 10 persons: setpoint 10 V - Maximum flow rate 1400 m³/h



If the fan flow rate or pressure changes upstream from the regulator (e.g. second room supplied by the same fan), the servomotor will adapt the blade opening to respect the setpoint.

Slaving accessories can be supplied (on option, please contact us):

- Ambience regulator
- CO2 probe
- Temperature probe
- Presence detector

DIMENSIONS AND WEIGHT (kg)

RRVS - Galvanized version - Frame and blades

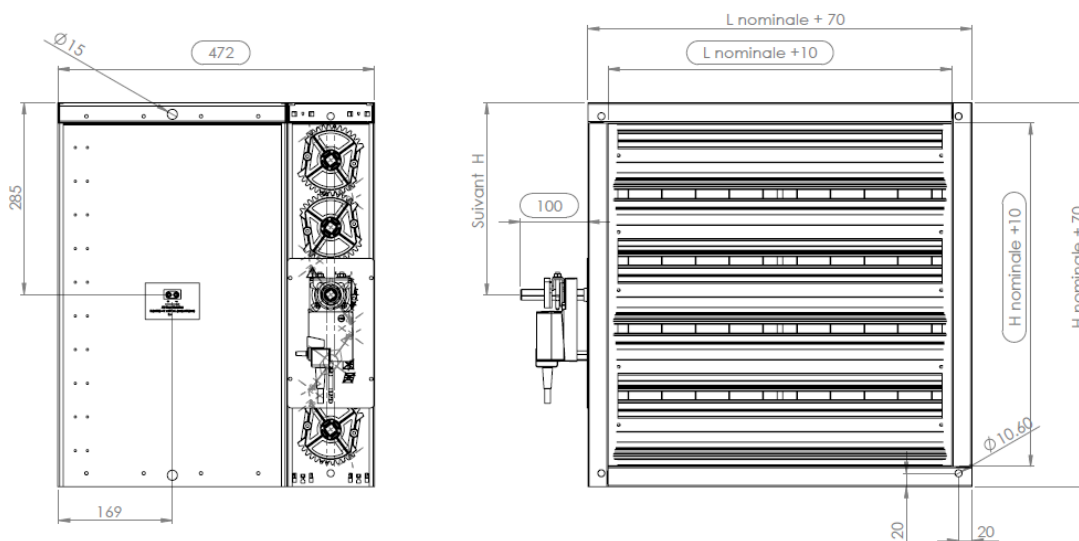
Weight (kg)		L nominal								
		200	300	400	500	600	700	800	900	1000
H nominal	100	9	10	11	13	14	15	17	18	19
	200	10	12	13	15	16	17	19	20	21
	300	12	13	15	16	18	19	21	22	24
	400	13	15	17	18	20	21	23	24	26
	500	15	17	18	20	22	23	25	26	28
	600	16	18	20	22	23	25	27	29	30
	700	18	20	22	23	25	27	29	31	33
	800	19	21	23	25	27	29	31	33	35
	900	21	23	25	27	29	31	33	35	37
	1000	22	25	27	29	31	33	35	37	39

VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

RRVS-T - Galvanized version - Frame and blades

Weight (kg)	L nominal									
	200	300	400	500	600	700	800	900	1000	
H nominal	100	9	11	12	14	16	17	19	22	23
	200	11	13	14	16	18	20	22	24	26
	300	12	14	16	18	20	22	24	27	29
	400	14	16	18	20	22	24	27	29	31
	500	16	18	20	22	24	27	29	32	34
	600	17	19	22	24	27	29	32	34	37
	700	19	21	23	26	29	31	34	37	39
	800	20	23	25	28	31	33	36	39	42
	900	22	25	27	30	33	36	39	42	45
	1000	24	26	29	32	35	38	41	44	47



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VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

DIAMETER SELECTED DEPENDING ON FLOW RATE

RRVS		L								
m³/h		200	300	400	500	600	700	80	900	1000
H	100	108 - 360	162 - 540	216 - 720	270 - 900	324 - 1080	378 - 1260	432 - 1440	486 - 1620	540 - 1800
	200	216 - 720	324 - 1080	432 - 1440	540 - 1800	648 - 2160	756 - 2520	864 - 2880	972 - 3240	1080 - 3600
	300	324 - 1080	486 - 1620	648 - 2160	810 - 2700	972 - 3240	1134 - 3780	1296 - 4320	1458 - 4860	1620 - 5400
	400	432 - 1440	648 - 2160	864 - 2880	1080 - 3600	1296 - 4320	1512 - 5040	1728 - 5760	1944 - 6480	2160 - 7200
	500	540 - 1800	810 - 2700	1080 - 3600	1350 - 4500	1620 - 5400	1890 - 6300	2160 - 7200	2430 - 8100	2700 - 9000
	600	648 - 2160	972 - 3240	1296 - 4320	1620 - 5400	1944 - 6480	2268 - 7560	2592 - 8640	2916 - 9720	3240 - 10800
	700	756 - 2520	1134 - 3780	1512 - 5040	1890 - 6300	2268 - 7560	2646 - 8820	3024 - 10080	3402 - 11340	3780 - 12600
	800	864 - 2880	1296 - 4320	1728 - 5760	2160 - 7200	2592 - 8640	3024 - 10080	3456 - 11520	3888 - 12960	4320 - 14400
	900	972 - 3240	1458 - 4860	1944 - 6480	2430 - 8100	2916 - 9720	3402 - 11340	3888 - 12960	4374 - 14580	4860 - 16200
	1000	1080 - 3600	1620 - 5400	2160 - 7200	2700 - 9000	3240 - 10800	3780 - 12600	4320 - 14400	4860 - 16200	5400 - 18000

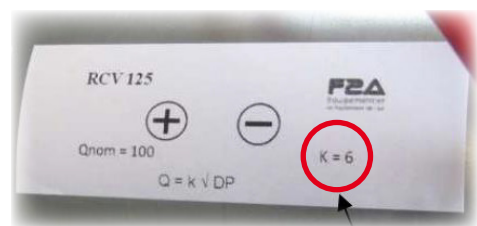
Flow range, $V_{min} = 1.5$ m/ and $V_{max} = 5$ m/s (for acceptable sound level).

FLOW RATE CONTROL

The flow rate measured can be obtained using the following formula and a coefficient K specific to each diameter. To do this, connect to the regulator (+) and (-) pressure taps.

$$Q_v = K \sqrt{\Delta P}$$

Q_v → Flow rate (m³/h)
 K → Factor K
 ΔP → Δ (total pressure (+) - static pressure (-))



Airflow control accuracy from setpoint value is about $\pm 10\%$ at minimum airflow and $\pm 5\%$ at maximum airflow.

INSTALLATION RECOMMENDATIONS

Provide a straight length upstream of 2 x height and downstream of 1 x height.
 In the event of an accident with high pressure drops, a higher upstream distance may be necessary (for example fire damper upstream of the RRVS damper).

VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

Dimensions	500 x 500 mm					
	50 Pa		100 Pa		250 Pa	
Pressure loss	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
Velocity	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
63Hz	51	53	54	57	59	63
125Hz	51	56	58	63	65	69
250Hz	47	53	55	58	64	67
500Hz	48	54	53	57	65	65
1000Hz	49	55	55	59	62	64
2000z	43	49	50	56	61	64
4000Hz	37	45	48	53	61	62
8000Hz	36	38	39	46	57	57
Global dB	57	62	63	67	72	74
Global dB(A)	52	58	59	63	68	70

Dimensions	600 x 600 mm					
	50 Pa		100 Pa		250 Pa	
Pressure loss	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
Velocity	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
63Hz	52	59	56	59	61	66
125Hz	51	56	59	63	65	70
250Hz	48	54	55	59	65	68
500Hz	49	54	54	58	65	66
1000Hz	53	56	57	60	64	65
2000z	44	50	51	57	63	66
4000Hz	37	47	49	54	61	63
8000Hz	36	38	39	47	58	58
Global dB	58	64	64	68	73	75
Global dB(A)	55	59	60	64	70	72

Dimensions	700 x 700 mm					
	50 Pa		100 Pa		250 Pa	
Pressure loss	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
Velocity	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
63Hz	54	65	57	62	62	69
125Hz	51	56	59	64	66	71
250Hz	48	54	56	60	66	70
500Hz	51	55	55	59	66	67
1000Hz	57	57	60	61	67	67
2000z	46	51	52	58	65	67
4000Hz	37	48	50	55	62	64
8000Hz	36	39	40	48	60	59
Global dB	60	67	65	69	74	77
Global dB(A)	58	60	62	65	71	73

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VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

Dimensions	800 x 800 mm					
	50 Pa		100 Pa		250 Pa	
Pressure loss	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
63Hz	55	67	59	63	64	70
125Hz	52	57	60	65	67	72
250Hz	49	55	57	61	67	71
500Hz	52	56	56	60	67	69
1000Hz	58	58	61	62	68	68
2000z	47	52	54	59	66	68
4000Hz	38	49	51	56	63	65
8000Hz	38	40	41	49	61	61
Global dB	62	68	66	70	75	78
Global dB(A)	59	61	63	66	73	74

Dimensions	900 x 900 mm					
	50 Pa		100 Pa		250 Pa	
Pressure loss	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
63Hz	56	68	60	64	65	71
125Hz	53	58	61	66	68	73
250Hz	50	57	58	62	68	72
500Hz	53	57	57	61	68	70
1000Hz	59	59	62	63	69	69
2000z	48	53	55	60	67	69
4000Hz	39	50	52	57	64	67
8000Hz	39	41	42	50	62	62
Global dB	63	69	67	71	76	79
Global dB(A)	60	62	64	67	74	75

Dimensions	1000 x 1000 mm					
	50 Pa		100 Pa		250 Pa	
Pressure loss	2 m/s	5 m/s	2 m/s	5 m/s	2 m/s	5 m/s
63Hz	57	69	61	65	66	72
125Hz	54	59	62	67	69	74
250Hz	51	57	59	63	69	73
500Hz	54	58	58	62	69	71
1000Hz	60	60	63	64	70	70
2000z	49	54	56	61	68	70
4000Hz	40	51	53	58	65	67
8000Hz	39	42	43	51	63	63
Global dB	64	70	68	72	77	80
Global dB(A)	61	63	65	68	75	76

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VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

ELECTRICAL CONNECTIONS

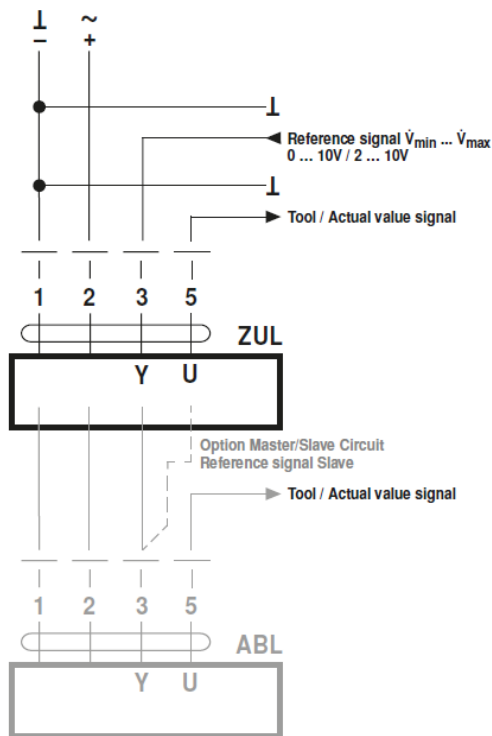
- MF version servomotor: non-communicating (standard)

The MF version does not allow communication. The air flow regulator operates independently using the configuration data. The output signal "U" can be used to display various operating parameters (blade opening, setpoint value).

• VARIABLE AIR VOLUME VAV OPERATION

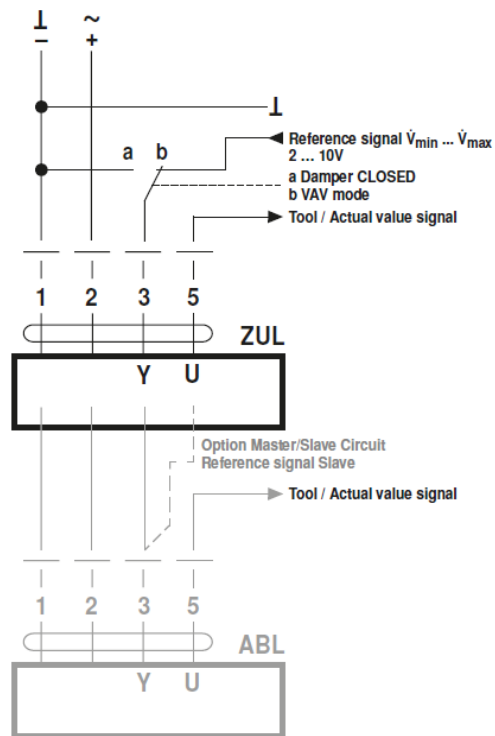
Example 1:

VAV, analogue reference signal



Example 2:

VAV with shut-off (CLOSED), 2 ... 10V mode



Description:

Damper CLOSED via 0 ... 10 V reference signal (Mode 2 ... 10 V)

Setting parameters:

Mode 2 ... 10 V, Shut off level 0.1 V or 0.5 V

If the required switching threshold of 0.1 V cannot be attained, the value can be switched to 0.5 V with PC-Tool.

Function: Standard 0.1 V: Shut-off level 0.5 V:

Damper		
CLOSED	<0.1 V	<0.5 V
\dot{V}_{min}	>0.1 ... 2 V	>0.5 V ... 2 V
$\dot{V}_{min} \dots \dot{V}_{max}$	2 ... 10 V	2 ... 10 V

In CAV applications shut-off level must not be set to 0.5 V, otherwise the open connection 3 is interpreted as damper CLOSED.

The control signal Y is calculated on the air flow range $Q_v \text{ min}/Q_v \text{ max}$ set in the factory.

The output signal U is calculated on the nominal air flow range of the selected ϕ .

VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

RRVS dampers can also be used for constant air flow operation.

• CONSTANT AIR VOLUME CAV OPERATION

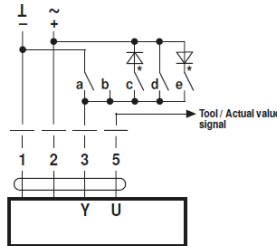
CAV control VAV-Compact can be adapted to the desired CAV function pattern for constant volumetric flow applications with PC-Tool by using the "CAV function":

- Damper CLOSED – \dot{V}_{min} – \dot{V}_{max} – damper OPEN (standard)
- Damper CLOSED – \dot{V}_{min} – \dot{V}_{mid} – \dot{V}_{max} – damper OPEN (NMV-D2M compatible)

Wiring diagrams

Notes

- Note that the contacts are mutually interlocking.
- DC supply: * c and e are not available with DC 24 V.
- Setting parameters in CAV applications:
Mode 2 ... 10 V, Shut-off level 0.1 V
In CAV applications shut-off level must not be set to 0.5 V, otherwise the open connection 3 is interpreted as damper CLOSED.



PC-Tool "CAV Function" setting:
2 ... 10 V, Shut-off level 0.1 V

CAV Function CLOSED – \dot{V}_{min} – \dot{V}_{max} – OPEN (standard)

	a	b	c	d	e
Signal	\downarrow –		~	~	~
Switching terminal 3	$\frac{ }{ }$ 3	$\frac{ }{ }$ 3	$\frac{\text{本}}{ }$ 3	$\frac{ }{ }$ 3	$\frac{\Psi}{ }$ 3
Mode 2 ... 10 V	CLOSED	\dot{V}_{min}	CLOSED*	\dot{V}_{max}	OPEN*
Mode 0 ... 10 V	\dot{V}_{min}	\dot{V}_{min}	CLOSED*	\dot{V}_{max}	OPEN*

PC-Tool "CAV Function" setting:
CLOSED – \dot{V}_{min} – \dot{V}_{max} . Shut-off level CLOSED: 0.1 V

CAV function CLOSED – \dot{V}_{min} – \dot{V}_{mid} – \dot{V}_{max} – OPEN

	a	b	c	d	e
Signal	\downarrow –		~	~	~
Switching terminal 3	$\frac{ }{ }$ 3	$\frac{ }{ }$ 3	$\frac{\text{本}}{ }$ 3	$\frac{ }{ }$ 3	$\frac{\Psi}{ }$ 3
Mode 2 ... 10 V	CLOSED	\dot{V}_{min}	\dot{V}_{mid} *	\dot{V}_{max}	OPEN*
Mode 0 ... 10 V	\dot{V}_{min}	\dot{V}_{min}	\dot{V}_{mid} *	\dot{V}_{max}	OPEN*

PC-Tool "CAV Function" setting:
CLOSED – \dot{V}_{min} – \dot{V}_{mid} – \dot{V}_{max} (NMV-D2M compatible)

- Communicating servomotors:

Communication protocols available are:

- MP BUS
- BACnet
- LON
- MODBUS

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VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

CONTROL ACCESSORIES

CO2 PROBE

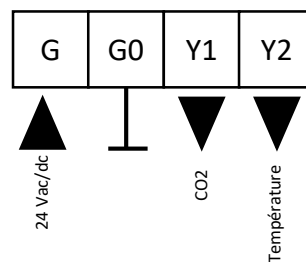
2 versions: installation in the room or in the duct
The probe measures the CO2 level and the temperature.

Two control outputs (0...10V or 2...V) can be controlled according to a single measured value or according to the maximum selection of the set of values. One output allows to regulate on the CO2 rate and the other output on the temperature. The settings can be changed using the configuration tool.

Technical characteristics

Power	24 Vca/cc (22...28 V), < 2W
Carbon dioxide measures	
Measuring range	0...2000 ppm
Precision (25°C)	gen. +40 ppm +3 % of reading values (ABCLogic™)
Long terme stability/year	< 2 % FS (ABCLogic™)
Time constants	< 2 min
Temperature measures	
Measuring range	0...50 °C
Precision (25°C)	±0.5 °C
Exits	0...10 V < 2 mA
Operating conditions	
Temperature	0...+50 °C
Moisture	0...85 % Hr (without cond.)
Case	ABS IP20 plastic
Installation in the room	
Mounting on wall surface or standard flush-mount housing (holes 60 mm apart)	
Dimensions (La x H x P)	87 x 86 x 30 mm
Installation in the duct	
Case IP54	
Dimensions (La x H x P)	105 x 104 x 155 mm

Wiring



VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

TEMPERATURE PROBE, IN THE ROOM

The temperature is detected by a Pt100 probe with a nominal resistance of 100 Ω at 0°C.
White plastic case.
Surface mounting or flush-mount housing.

Technical characteristics

Probe	Pt100 EN 60751/B
Housing	IP 20, ABS
Measuring range	0...50°C
Precision	$\pm 0.3^\circ\text{C} / 0^\circ\text{C}$
Dimensions (La x H x P)	86 x 85 x 30 mm

TEMPERATURE PROBE

The temperature is detected by Pt100 probe with a nominal resistance of 100 Ω at 0°C.
The screw-on cover and the 45° inclined terminal block facilitate installation.
The housing is made of heat-resistant plastic.
The sensor is mounted on the duct with an adjustable connection flange for optimal temperature sensing.
The installation depth can be adjusted between 100 ... 200 mm approximately.

Technical characteristics

Probe	Pt100 EN 60751/B
Rod	\varnothing 8 mm x 220 mm
Connexion à la gaine	Bride
Housing	Plastique (< 120 °C)
Protection class	IP 54
cable inlet or rod down	
Cable inlet	M16
Measuring range	-50...70 °C

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VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

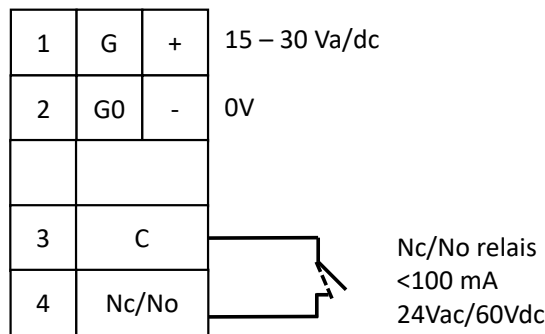
PRESENCE SENSOR

The presence sensor has 2 functions: presence sensor (occupied, S4 = on) and movement sensor (S4 = off). As soon as movement is detected, the sensor switches to presence detection mode. A parameterizable delay of 1 to 20min keeps the sensor in presence mode once the movement detection has been validated. The relay functions (nc/no), indicator lamp and sensitivity adjustment can be set using the jumpers S1... S4. The red led stays on for 2s from the detection movement.

Technical characteristics

Power 24Vac / dc, 15...30V ac/dc <0,5W
 Functions mouvement / présence
 Exit NC* / NO, <100mA 24Vac / 60Vdc
 Relay contact 2s, 2 min, 10 min or 20 min*
 Housing Plastique blanc, IP20
 Surface mounted version or wall installation.
 Led stays on for 2s from the detection movement.

Wiring



ROOM REGULATOR

- Temperature and / or air quality regulator (CO2 level)
- Applications:
 - Hot and cold with VAV
 - Hot with radiator and cold with VAV
 - Cold alone
 - Air quality control (CO2)
- Reheating battery control
- Communication Modbus RTU (RS485)
- LCD display

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VARIABLE AIR FLOW REGULATOR

RRVS / RRVS-T

Technical characteristics

Power		24 Vac/cc (20...28 V) < 1 VA
Set point	- Day mode	18...26 °C, *21 °C, ±3 °C
	- Night mode	Frost protection 8...50 °C, *17 °C
Precision (innacurate measurement)		±0.5 °C
Exit		4x 0...10 V, 2 mA
		2x sorties triac 24 Vac1 A pour actionneurs thermiques
Surrounding humidity		0...85 % HR (without condensation)
Terminals		1,5 mm ²
Plastic housing ABS		IP20
Dimensions (La x H x P)		87 x 86 x 32 mm

Terminals

G	GO	Y1	Y2	DI1	A1	Y3	A2	Y4	U1	A+	B-	C	S/DIZ	GO
		Exit	Exit	Entry	Exit	Entry	Exit	Exit	Entry	Com.	Com.	Com.	Entry	
Alim. 24 Vac	0 Vac	0...10V VAV	0...10V VAV	PIR/Card	24 Vac 1A cold valve	0...10V cold valve	24Vac 1A hot valve	0...10V hot valve	0...10V (CO2 ou Compens.)	RS485	RS485	RS485 Commun	Contact sensor	0 Vac

DATA TO BE SUPPLIED

For each RRVS unit, various items of information must be supplied to ensure that the programming and marking match the requirements of your information as closely as possible:

Identification mark (in your installation)

Operating type:

- Variable air flow
- Constant air flow

Operating flow rate (within the ranges defined according to the diameter; see table of dimensions and weights):

- Qv min (m3/h)
- Qv max (m3/h)